Cladonia squamosa (Scop.) Hoffm.

" " var. *muricella* (Del.) Wainio. (*Cl. squamosa* f. *attenuata* Fr.)

" *subcariosa* Nyl. (*Cl. gracilis* var. *verticillata* f. *symphycarpia* Tuck., *Cl. symphycarpa*, in part, of American authors, not Fries.)

" *sylvatica* Hoffm. (*Cl. rangiferina* var. *sylvatica* (L.) Schaer.)

" *turgida* (Ehrh.) Hoffm.

" *uncialis* (L.) Web.

" *verticellata* Hoffm. (*Cl. gracilis* var. *verticellata* Fr.)

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Wellesley, Mass.

"THE LICHENS OF MINNESOTA."

A Review.

LINCOLN W. RIDDLE.

In 1896 appeared in the Minnesota Botanical Studies the first of Professor Bruce Fink's now well-known series of papers setting forth the ecological and distributional data resulting from an extensive field study of the lichens of Minnesota. The seven years that have elapsed since the last number of this series have been devoted to a critical study of the material in the herbarium and library. We now have the final systematic results of this study published under the title "The Lichens of Minnesota" as one of the contributions from the U. S. National Herbarium (Vol. 14, part 1, pp. 1–269, with 51 plates, and 18 text-figures. Published by the Smithsonian Institution, Washington, D. C. June 1, 1910).

Professor Fink states that the book is intended not only for specialists but also for younger students. Accordingly, the first 33 pages are devoted to a general account of the morphology, reproduction, and economic role of lichens, the text being illustrated with figures taken from various authorities. We then come to the descriptive catalogue of Minnesota lichens, with an outline of the classification adopted by the author, a key to the genera, and a systematic account of the species and subspecies of each genus, with keys, detailed descriptions, habitat notes, and geographical range. This catalogue includes 439 species and subspecies. A glossary and index close the book.

Several factors make this work the most notable publication in North American Lichenology since the appearance of Tuckerman's Synopsis. The first factor is the long experience of the author in the study of lichens in general, covering a period of twenty-five years, during which he has had the

benefit of correspondence with the foremost American and European students, and during the latter part of which he has been called upon as a specialist to study collections from many parts of the country, The second factor is the long continued and thorough special work in Minnesota, upon which the book is based, extending as it does over fifteen years of field and herbarium study. The book is especially noteworthy in being the first American publication, including a large proportion of our species, to contain complete keys to the genera and species. The lack of such keys has been a serious handicap to all students of lichens, and especially to beginners in the study. Another feature of the work which is deserving of special mention is the large number of excellent photographs of typical specimens, with which the descriptive catalogue is illustrated. As an aid to the recognition of the plants and as an indication of their natural habits these photographs leave nothing to be desired.

Professor Fink's experience and the conservatism of his previous publications lead us to examine with special interest the views on classification expressed in this work. The general outlines of the classification and the arrangement and limitation of the families is in general similar to that proposed by Doctor Zahlbruckner in Engler and Prantl's Die Natürlichen Pflanzenfamilien, which undoubtedly represents better than any other system yet offered our present ideas as to the natural classification of lichens. Professor Fink's most marked departures from this are in retaining *Buellia* among the Lecideaceae, a safe and conservative procedure, and in placing the Pyrenocarpineae at the end of the system. This position seems to be open to question. While it is clearly recognized that no linear arrangement can truly represent a natural system of classification it is generally assumed that the groups placed at the end of the system are the highest in evolution. The placing of the Pyrenocarpineae in such a position can only be justified as following the custom of the mycologists in placing the Pyrenomycetes above the Discomycetes among the fungi. For those who hold the view that the lichens represents lines of evolution in a different direction from the other fungi, a position for the lowly organized Pyrenolichenes at the beginning of the system seems much more natural.

In the matter of generic limitations Professor Fink has followed the best mycological usage of the present day in recognizing the value of spore-differences, especially among the crustaceous lichens, where the thalline characters are of such slight importance. The following genera for the most part based on spore-differences are recognized in the present work, having been included by Tuckerman in other genera: *Chaenotheca*, *Biatorella*, *Megalospora*, *Biatorina*, *Bilimbia*, *Bacidia*, *Rhizocarpon*, *Psora*, *Toninia*, *Icmadophila*, *Synecohoblastus*, *Gyrophora*, *Acarospora*, *Haematommia*, *Arthopyrena*, *Thelocarpon*, *Dermatocarpon*. These genera are almost universally recognized among European lichenologists, but American students have been slow in accepting them on account of the weight of Tuckerman's authority. Professor Fink has done well therefore in encouraging a more liberal interpretation of generic limits. The recognition of

these genera has made necessary some new combinations in specific names, but we are glad to say that these are not many. It may be noted in passing that as the author of one of these new combinations, *Bacidia akompsa* (Tuck.), Dr. Herre has priority in his "Lichens of the Santa Cruz Peninsula, California" (Proc. Wash. Acad. Sci. vol. 12, no. 2, pp. 27–269. May 15, 1910).

The problem of the "type-species" of genera is one which has as yet reached no satisfactory solution, and upon which depends much of the future of botanical nomenclature. Professor Fink has contributed to the problem among the lichens by citing under each genus the first species to be described under that generic name. According to some authorities this would be the type species. If this rule were to be followed among the lichens, where so many of the generic names rest upon a basis of long usage only, the resulting changes and confusion would be such as to render the nomenclature of lichens a hindrance rather than an aid. We are glad to find that while Professor Fink has indicated what he considered to be the type species under each genus, he has wisely left the carrying out of the application of the principle to future study, and has left the generic names to stand according to their long accepted interpretation.

In the matter of specific names, he has even been what we may call ultra-conservative. Where an author of high standing shows that a specific name should be replaced by another on the basis of well-founded priority, there seems to be no good reason for not accepting the older name. An example of this is in the genus *Icmadophila*, where Wainio has shown that the specific name *ericetorum* (L.) has priority over *aeruginosa* (Scop.).

The use of trinomials for what is referred to as "sub-species" indicates clearly the need of more uniformity among lichenologists in the use of the terms "sub-species," "variety," and "form," as applied to the subdivisions of polymorphic species. Such a uniformity of usage, however, would have to rest on a study of these species extensive enough to prove the relative value of their components, and such a study has as yet been made in comparatively few cases.

In refreshing contrast to many recent publications in Systematic Botany, Professor Fink has found it necessary to name only one new species in this publication—*Omphalaria minnesotensis*; and in all of his preliminary work only two new species and three new varieties. New species proposed on such a conservative scale are fairly certain to prove valid enough to stand future investigations.

Admirably adapted as the work is for the use of all students, we cannot help feeling that it might have been more valuable still if the somewhat lengthy descriptions had been condensed into diagnoses giving the essential characters and these followed by some comparative notes indicating the resemblance and differences between the species under consideration and closely related species. Such notes based on Professor's Fink's wide experience in field and herbarium would have been of the greatest value to all students. For an experienced student it is an annoyance as well as consid-

erable labor to read through two long descriptions, comparing them character by character, in order to find out in what respect the plants differ. By confining the descriptions to diagnoses or by giving the diagnostic characters in italics, this annoyance might easily have been avoided with great benefit to those who are to use the book.

The lichens found in Minnesota are, for the most part, those occurring throughout temperate North America, east of the Rocky Mountains. For all students in this region, Professor Fink's "Lichens of Minnesota," with its keys, its descriptions, its photographs, and last but not least its conservative spirit, must prove a work of the very greatest usefulness.

Wellesley, Mass.

POLYTRICHUM STRICTUM IN PENNSYLVANIA.

Otto E. Jennings.

In the northwestern corner of Pennsylvania, near Linesville, in Crawford County, there is a great area of swampy or boggy land lying to the south of a row of morainal hills. This area collectively is known as the Pymatuning Swamp and extends with one interruption for a distance of about seventeen miles and in one place is about one mile wide.

During the last six years the writer has made repeated excursions to this swamp, studing the flora both ecologically and systematically, and a number of very interesting things, botanically speaking, are to be found there. The bog is in places a very characteristic Canadian Tamarack-Sphagnum bog (*Larix-Sphagnum* association) and in places has become southern in its relationship, with a Black Ash-Lizard Tail swamp (*Fraxinus nigra-Saururus* association).

In one place near Linesville there is a small area, not over half-an-acre in extent, where the vegetation is made up exclusively of a Cassandra-Polytrichum heath, and it was with considerable surprise and interest that the moss was found to be typical *Polytrichum strictum* Banks. (Collected May 28, 1908, O. E. Jennings.)

The occurrence here of this species of Polytrichum is noteworthy in that the species is so distinctly northern in its distribution and as far south as the northern states it is mainly restricted to rather elevated boggy alpine regions. So far as the writer is aware this species has never before been reported from either Pennsylvania or from Ohio, whose boundry line is but a few miles distant, and, furthermore, the moss occurs here at a comparatively low elevation, about 980 feet above the sea.

Carnegie Museum, August 22, 1910.

NOTES FROM EUROPE.

Annie Lorenz.

The following are brief notes of the writer's collecting experiences on a European trip, not undertaken primarily for botanical purposes, in the early summer of 1909.

The writer's first European botanizing was at Burgsteinfurt, a small town in Westfalen; her first walk in the Bagno, the Prinz von Bentheim's